



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/649,746	08/28/2003	Fukashi Harada	031071	5719
23850	7590	05/03/2004	EXAMINER	
ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP 1725 K STREET, NW SUITE 1000 WASHINGTON, DC 20006			NADAV, ORI	
		ART UNIT	PAPER NUMBER	
		2811		

DATE MAILED: 05/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/649,746	HARADA ET AL. 
Examiner	Art Unit	
ori nadav	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 28 August 2003.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-22 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-22 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 28 August 2003 is/are: a) accepted or b) objected to by the Examiner.

 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) Notice of Informal Patent Application (PTO-152)
6) Other: _____.

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

Figure 8 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The disclosure is objected to because of the following informalities: The recitation of a "circle in figure 6" (see page 13) is not illustrated in figure 6.

Appropriate correction is required.

Claim Objections

Claims 1-7 are objected to because of the following informalities: The term "another in line 10 of claim 1, should read "other". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant illustrates in figure 8 and describes in related text (pages 2 and 3) the disadvantages of a conventional device which includes forming a compound semiconductor film which contains silicon and another semiconductor element, and has a composition with a high content of silicon in an upper layer region and a lower layer region, and a high content of the other semiconductor element in an intermediate layer region. The present invention recites an intermediate layer region being the region which is formed on the side wall of opening 8 (page 10). The side wall of the opening 8 has a high content of silicon (page 13). Therefore, the intermediate layer region has a high content of silicon. Furthermore, the detailed description of the disclosure does not recite an intermediate layer region having a high content of the other semiconductor element. Therefore, there is no support in the detailed description of the disclosure for forming on an entire surface a compound semiconductor film which contains silicon and another semiconductor element, and has a composition with a high content of silicon in an upper layer region and a lower layer

region, and a high content of the other semiconductor element in an intermediate layer region, as recited in claims 1 and 8.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 4, 6, 8-9, 11-12, 14, 16-17, 19-20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asai et al. (6,713,790) in view of Applicant Admitted Prior Art (AAPA).

Regarding claims 1, 8 and 11, Asai et al. teach in figures 7-11 a manufacturing method of a semiconductor device which is formed with a bipolar transistor being composed by including a base, an emitter and a collector on a semiconductor substrate, comprising the steps of:

forming a multilayer film 115, 117, 120 on said semiconductor substrate 100, and forming an opening which is opened on said base and said emitter, in the multilayer film;

forming on an entire surface a compound semiconductor film 111 which contains silicon and another semiconductor element; and

performing anisotropic dry etching (column 20, lines 19-27) for the compound semiconductor film so as to reach a certain height of the opening.

Note that the broad recitation of the claim does not require the compound semiconductor film to be anisotropic dry etched.

Asai et al. do not teach a compound semiconductor film having a composition with a high content of silicon in an upper layer region and a lower layer region, and a high content of the other semiconductor element in an intermediate layer region.

AAPA teaches in pages 2-3 that it is conventional to obtain a compound semiconductor film which contains silicon and another semiconductor element, and has a composition with a high content of silicon in an upper layer region and a lower layer region, and a high content of the other semiconductor element in an intermediate layer region

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a compound semiconductor film having a composition with a high content of silicon in an upper layer region and a lower layer region, and a high content of the other semiconductor element in an intermediate layer region in Asai et al.'s device in order to simplify the processing steps of making the device by using a conventional processing method.

Regarding claims 2 and 9, Asai et al. teach using a high vacuum (column 3, lines 56-57). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an anisotropic dry etching in a high vacuum in Asai et al.'s device in order to obtain better etching performance.

Regarding claims 4, 6, 12 and 14, Asai et al. do not teach the atmospheric pressure in the high vacuum state is lower than 66.5 Pa and about 0.33 Pa. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an atmospheric pressure in the high vacuum state of Asai et al.'s device to be lower than 66.5 Pa and about 0.33 Pa in order to obtain proper etching conditions.

Regarding claims 16-17, 19-20 and 22, Asai et al. teach the compound semiconductor film comprises an SiGe film or an SiGeC film.

Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to *Examiner Nadav* whose telephone number is **(571) 272-1660**. The Examiner is in the Office generally between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **308-0956**



O.N.
4/29/04

ORI NADAV
PATENT EXAMINER
TECHNOLOGY CENTER 2800